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(54) **IMAGE FORMING APPARATUS WITH DEVELOPER RECOVERY CONTAINER**

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(30) **Foreign Application Priority Data**

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G03G 21/10 (2006.01)
G03G 21/12 (2006.01)

(52) **U.S. Cl.**
CPC ***G03G 21/1676*** (2013.01); ***G03G 21/1647*** (2013.01); *G03G 21/105* (2013.01); *G03G 21/12* (2013.01); *G03G 2221/1624* (2013.01)

(58) **Field of Classification Search**
CPC G03G 2221/0052; G03G 2221/1624; G03G 21/12; G03G 21/105; G03G 21/007; G03G 21/1676
See application file for complete search history.

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(57) **ABSTRACT**

An image forming apparatus includes a developer recovery container having a rotatable member; an attachment structural section to which the container is detachably attached; and a rotation transmission mechanism disposed in the attachment structural section and connected to the rotatable member to transmit rotational driving force thereto when the container is attached. The mechanism includes a shaft extending in a direction of movement occurring when the container is attached and detached, a rotationally-driven stationary transmission member, a displacement transmission member attached to the shaft and rotationally shifting in an axial direction thereof in conjunction with the movement, and a moving member moving the displacement member toward the stationary member. The displacement member connects to and disconnects from the stationary member when the container is attached and detached, respectively. The container has a stopper that moves the moving member toward the stationary member when the container is attached.

5 Claims, 11 Drawing Sheets

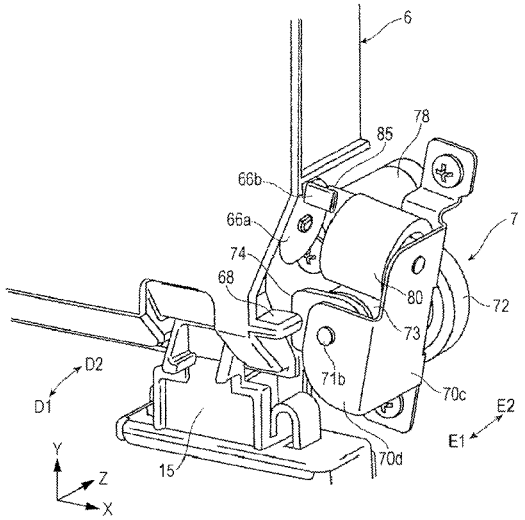


FIG. 1

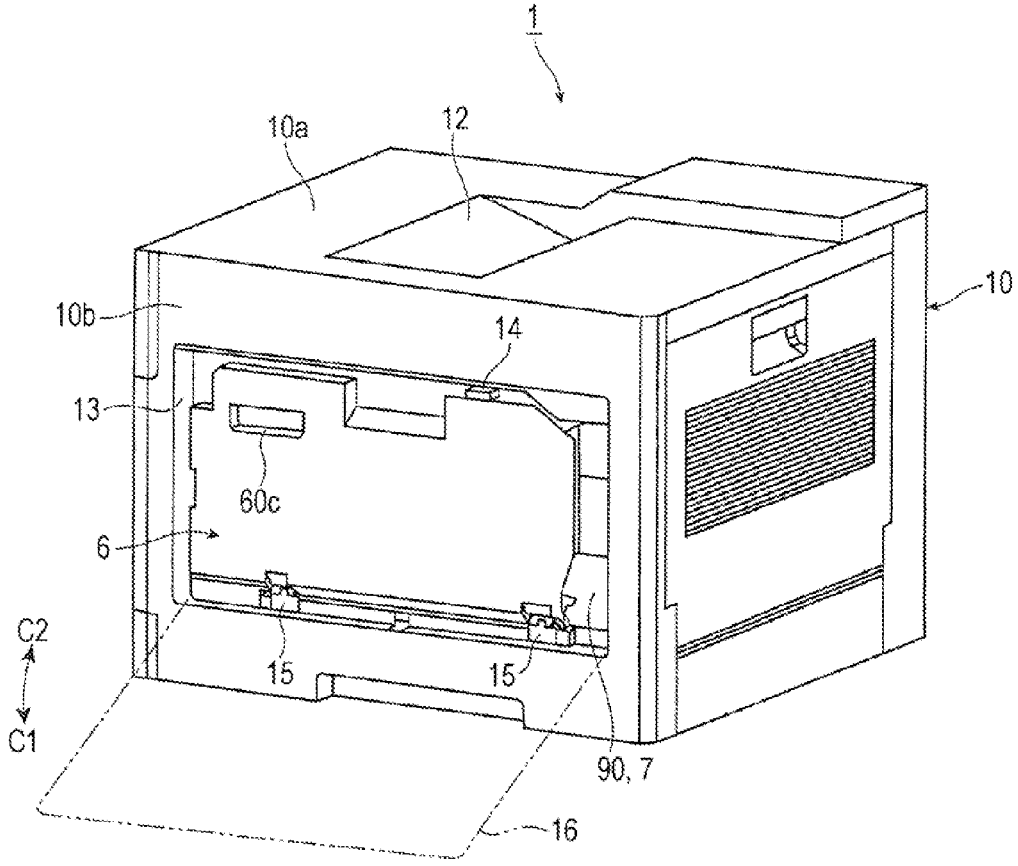
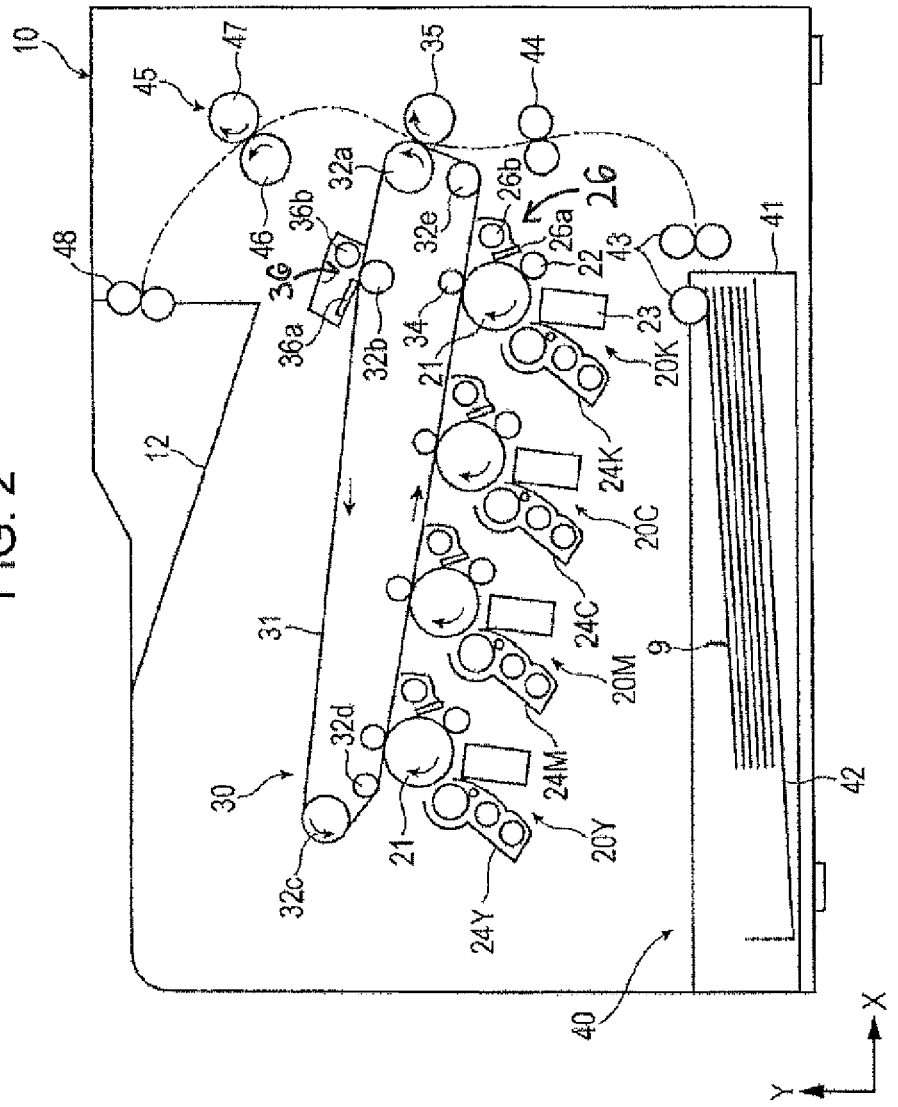


FIG. 2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46
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26b
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32e
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36a
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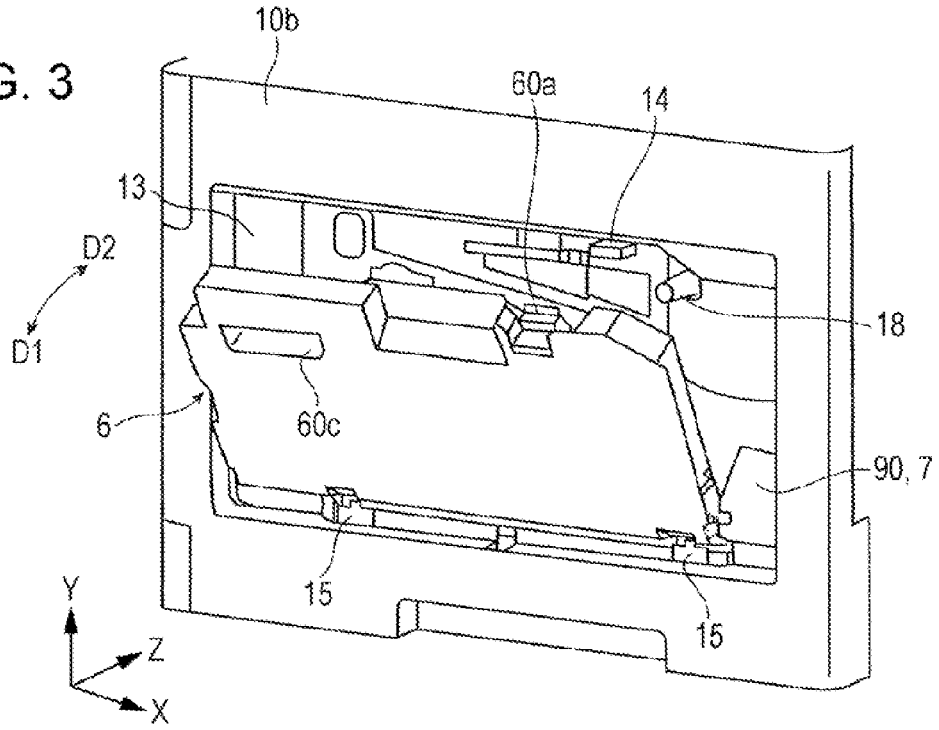
34
21
23
20K
12
24K
20C
24C
31
20M
9
32d
30
24M
42
21
20Y
32c
24Y
40
X
Y

FIG. 3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D2
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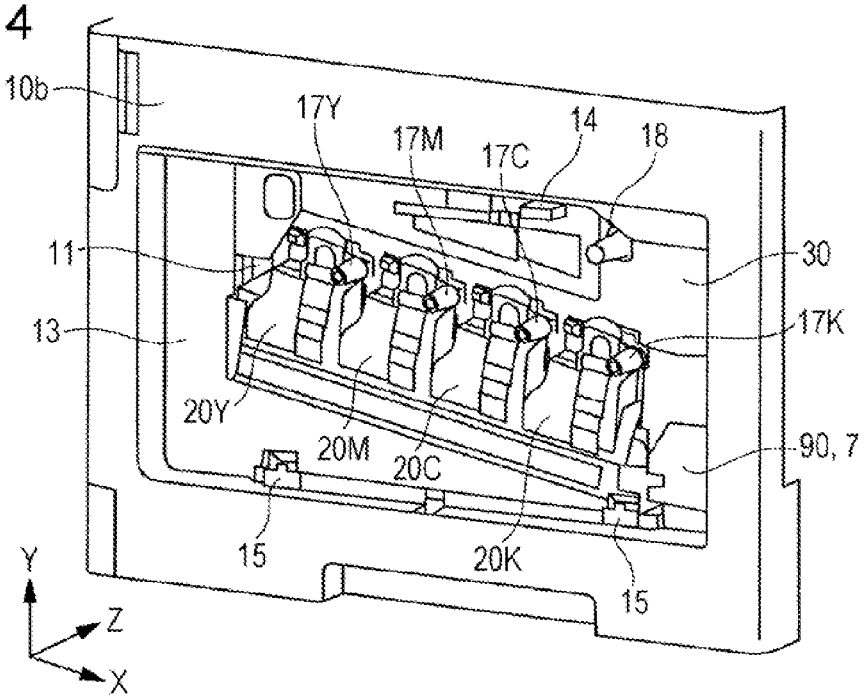
6
60c
90, 7
15
15
Y
Z
X

FIG. 4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Z
X

FIG. 5

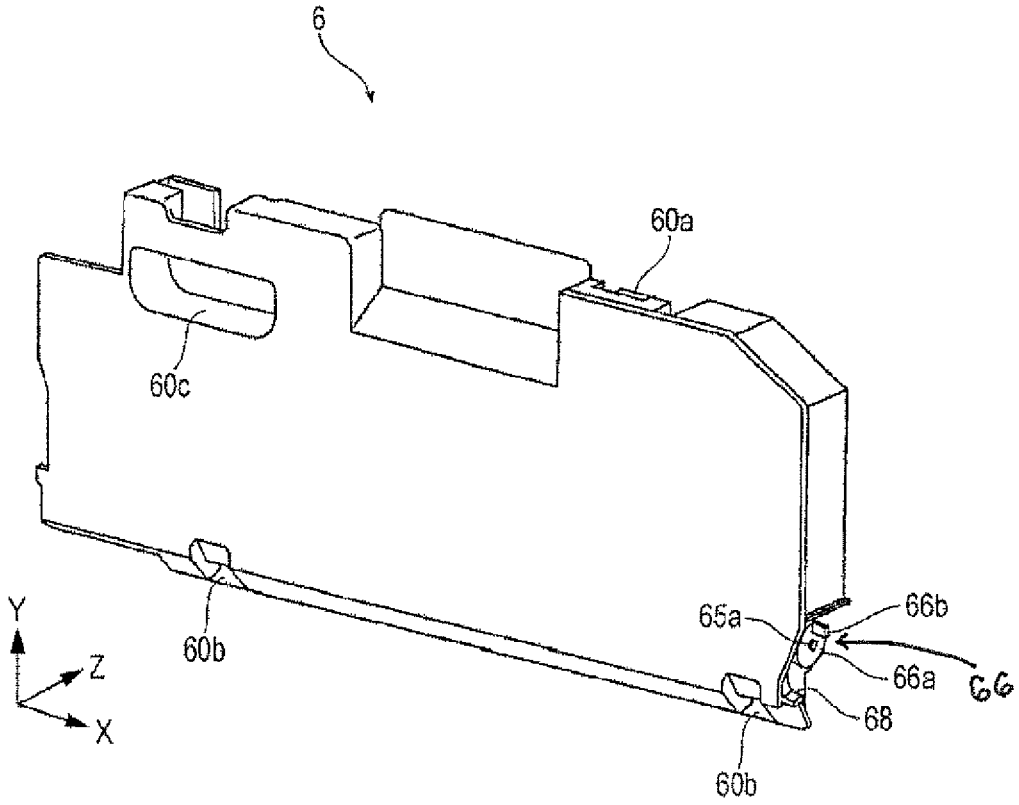


FIG. 6

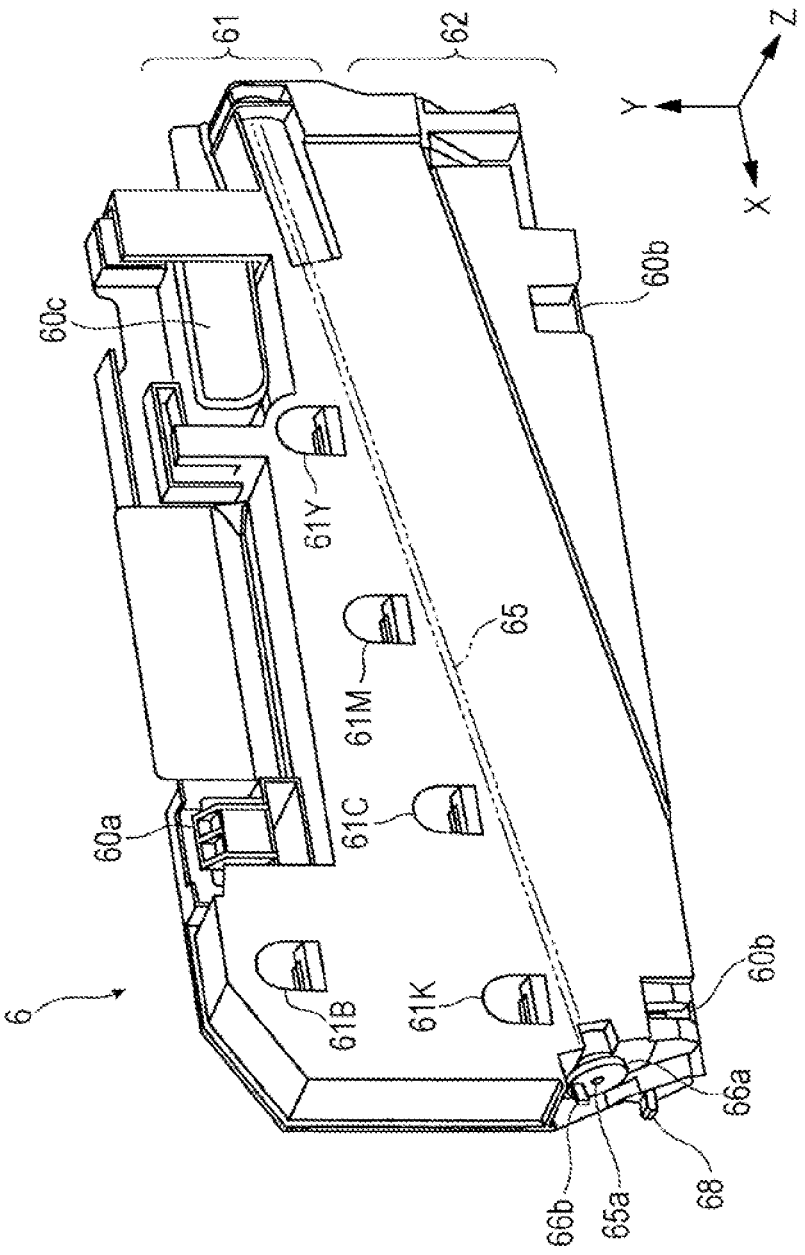


FIG. 7

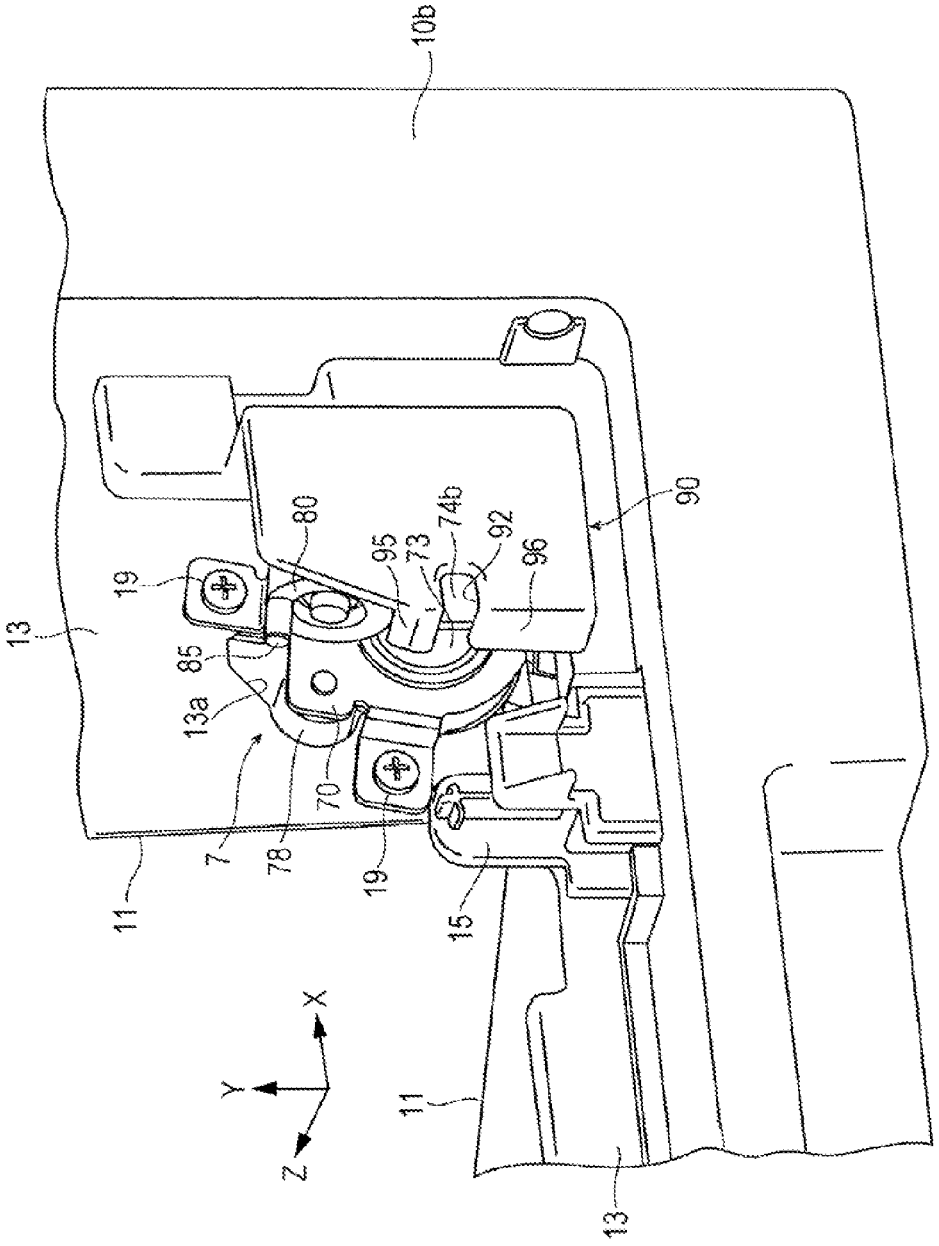
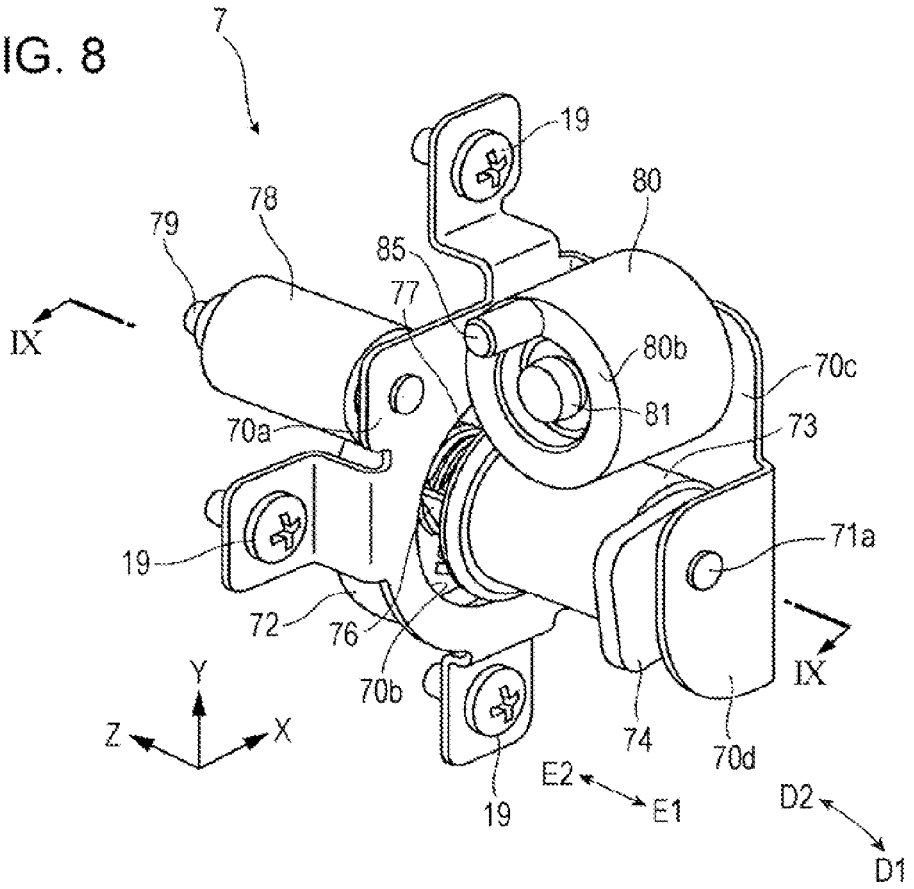


FIG. 8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19
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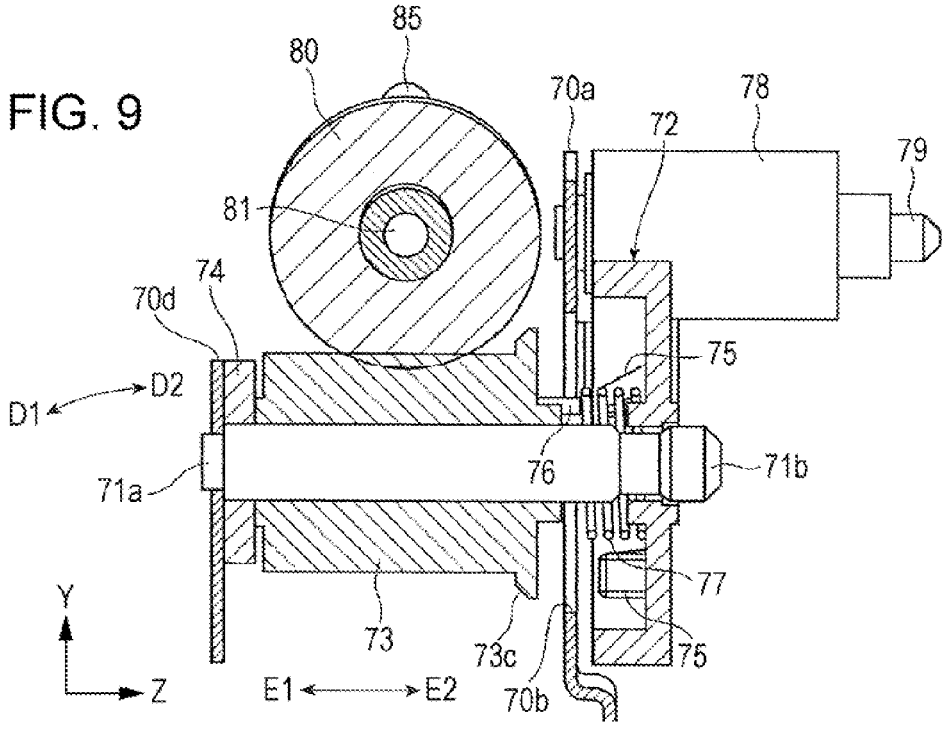
70c
81
70a
73
71a
19
72
76
70b
IX
Y
Z
X
74
70d
E2
E1
19
D2
D1

FIG. 9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D1
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71b
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Y
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73c
75
E1
E2
70b

FIG. 10

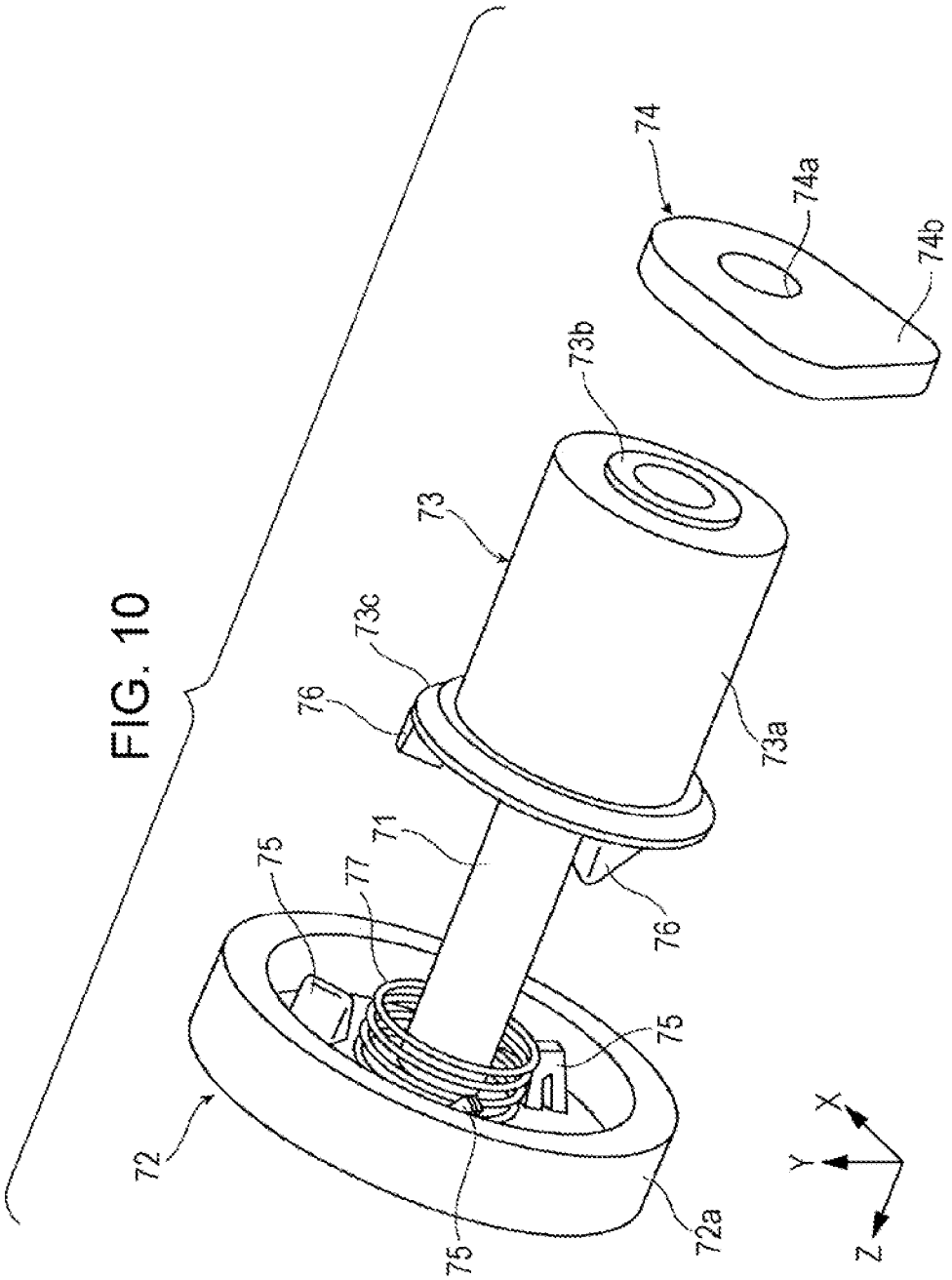


FIG. 11

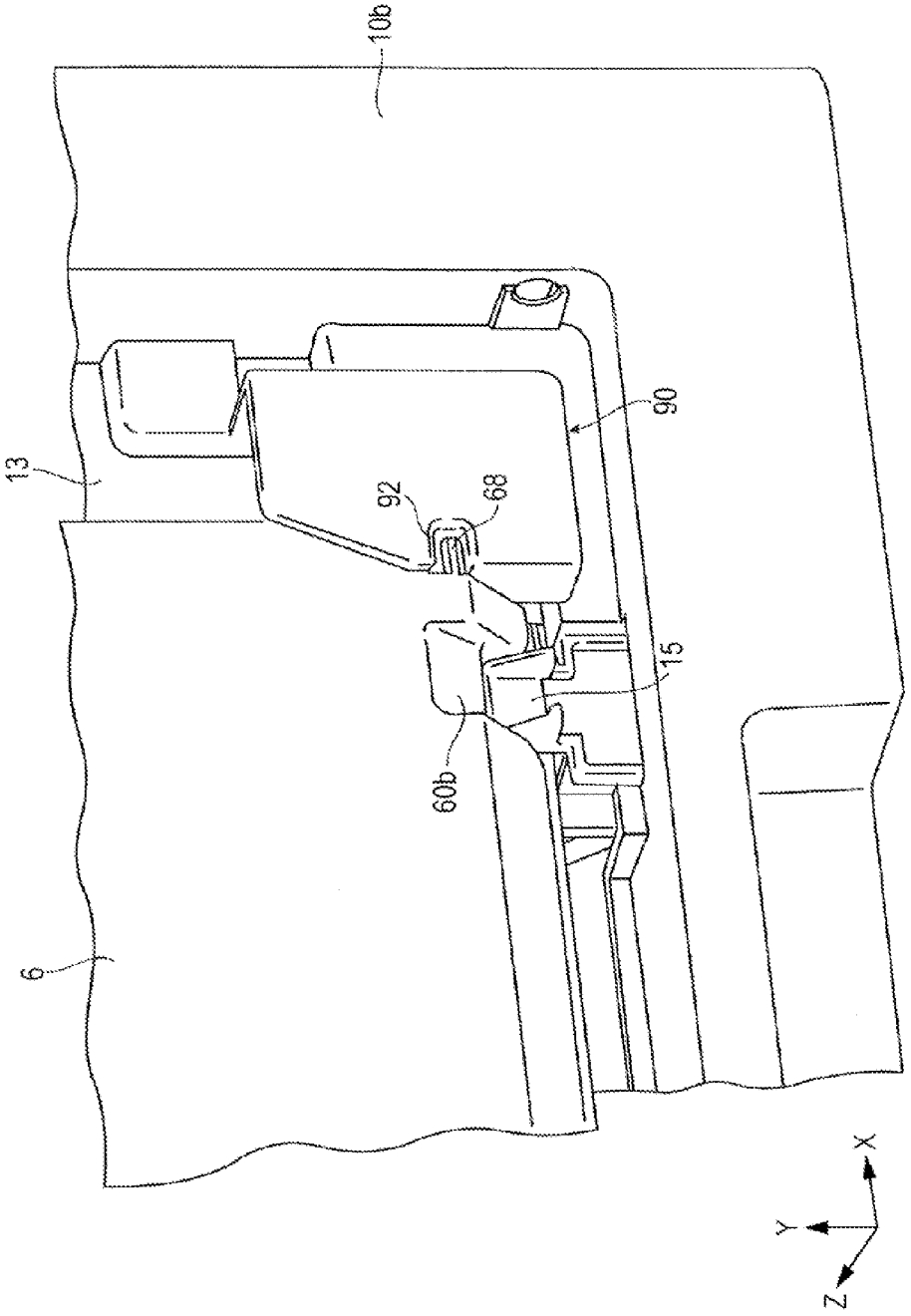


FIG. 12

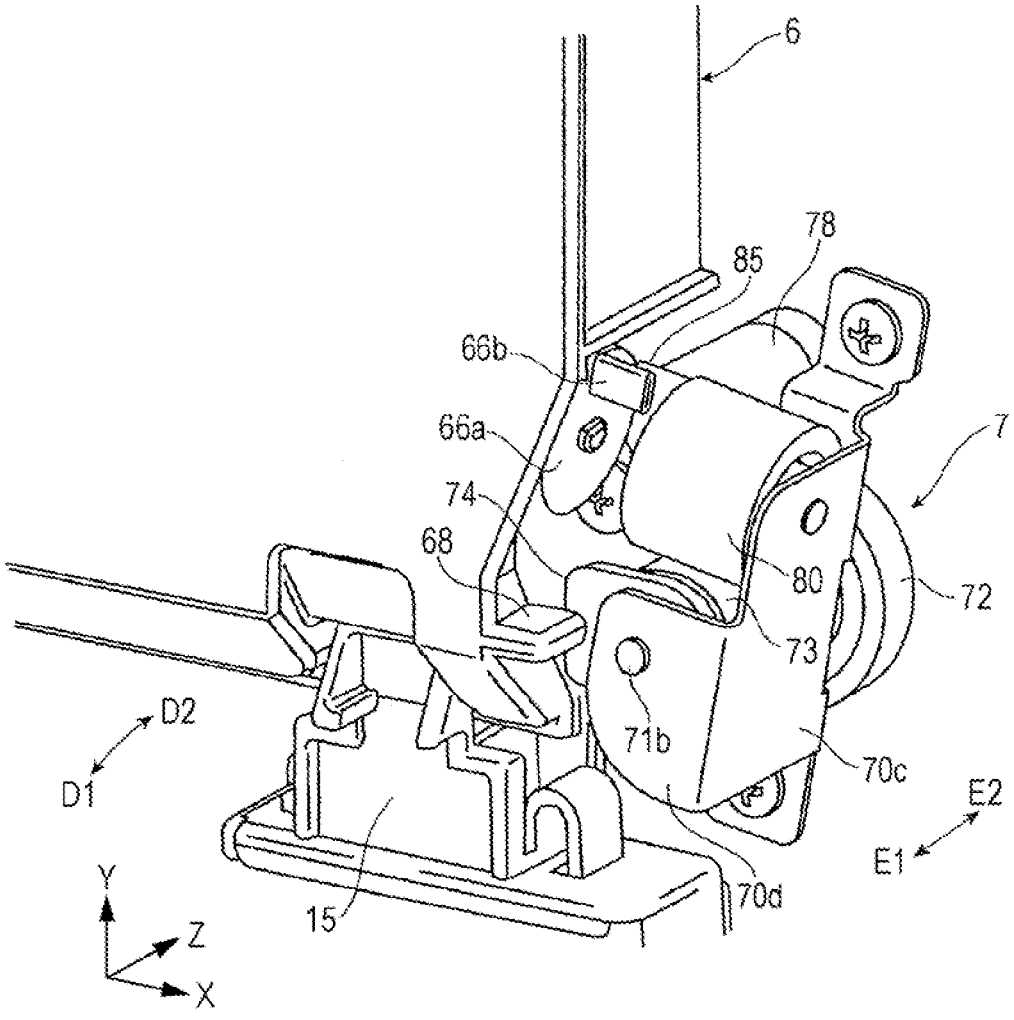
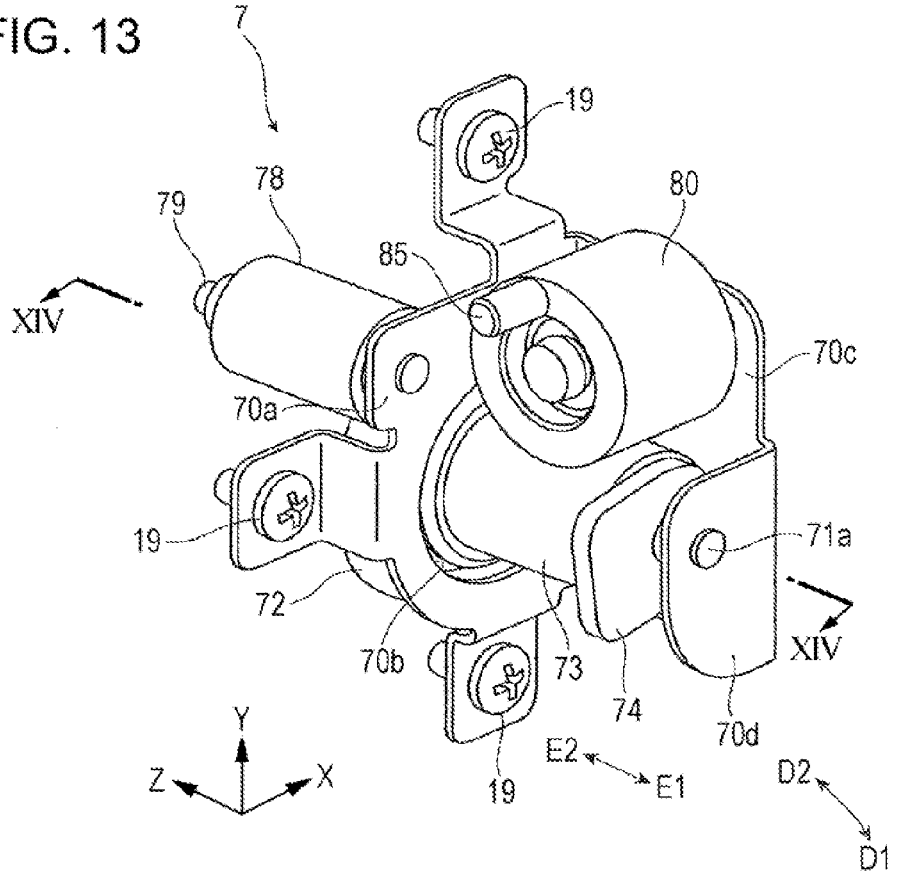


FIG. 13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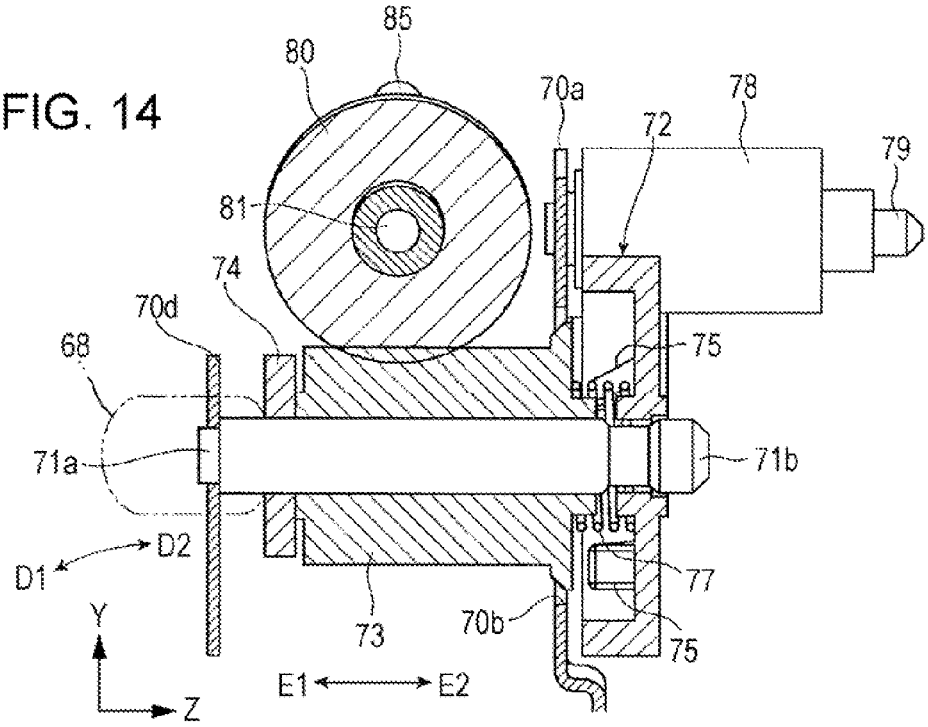
73
74
70d
XIV
Y
Z
X
19
E2
E1
D2
D1

FIG. 14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70b
75
Y
Z
E1
E2

IMAGE FORMING APPARATUS WITH DEVELOPER RECOVERY CONTAINER

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2015-053384 filed Mar. 17, 2015.

BACKGROUND

Technical Field

The present invention relates to image forming apparatuses.

SUMMARY

According to an aspect of the invention, there is provided an image forming apparatus including a developer recovery container, an attachment structural section, and a rotation transmission mechanism. The developer recovery container has a rotatable member. The developer recovery container is detachably attached to the attachment structural section. The rotation transmission mechanism is disposed in one area of the attachment structural section and is connected to the rotatable member and transmits rotational driving force to the rotatable member when the developer recovery container is attached. The rotation transmission mechanism includes a shaft, a stationary transmission member, a displacement transmission member, and a moving member. The shaft extends in a direction of movement occurring when the developer recovery container is attached and detached. The stationary transmission member is disposed in a positionally fixed state and is rotationally driven. The displacement transmission member is attached to the shaft such that the displacement transmission member rotates and shifts in an axial direction of the shaft in conjunction with the movement occurring when the developer recovery container is attached and detached. The displacement transmission member shifts toward and connects to the stationary transmission member when the developer recovery container is attached. The displacement transmission member shifts away from and disconnects from the stationary transmission member when the developer recovery container is detached. The moving member moves the displacement transmission member toward the stationary transmission member. The developer recovery container has a stopper that comes into contact with the moving member and that moves the moving member toward the stationary transmission member when the developer recovery container is attached.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention will be described in detail based on the following figures, wherein:

FIG. **1** is an external perspective view of an image forming apparatus according to a first exemplary embodiment (in a state where an external cover thereof is open);

FIG. **2** schematically illustrates an internal configuration of the image forming apparatus in FIG. **1**;

FIG. **3** is a partial perspective view illustrating a state where a developer recovery container is being attached to or detached from the image forming apparatus in FIG. **1**;

FIG. **4** is a partial perspective view illustrating a state where the developer recovery container is detached from the image forming apparatus in FIG. **1**;

FIG. **5** is a perspective view illustrating the developer recovery container detachably attached to the image forming apparatus in FIG. **1**, as viewed from the front side thereof;

FIG. **6** is a perspective view illustrating the developer recovery container in FIG. **5**, as viewed from the rear side thereof;

FIG. **7** is an enlarged perspective view illustrating the configuration of a rotation transmission mechanism and an attachment structural section for the developer recovery container in the image forming apparatus in FIG. **1**;

FIG. **8** is a perspective view illustrating the state of a relevant part of the rotation transmission mechanism in FIG. **7** (i.e., when a displacement gear is in a disconnected state);

FIG. **9** is a cross-sectional view of the rotation transmission mechanism, taken along line IX-IX in FIG. **8**;

FIG. **10** is an exploded perspective view illustrating a shaft, a first stationary gear, and the displacement gear that constitute the rotation transmission mechanism;

FIG. **11** is an enlarged perspective view illustrating a state where the developer recovery container is attached to the attachment structural section in the image forming apparatus in FIG. **1**;

FIG. **12** is an enlarged perspective view illustrating the state of the developer recovery container and the rotation transmission mechanism when the developer recovery container is attached to the attachment structural section;

FIG. **13** is a perspective view illustrating the state of the relevant part of the rotation transmission mechanism in FIG. **12** (i.e., when the displacement gear is in a connected state); and

FIG. **14** is a cross-sectional view illustrating the rotation transmission mechanism, taken along line XIV-XIV in FIG. **13**.

DETAILED DESCRIPTION

Exemplary embodiments of the present invention will be described below with reference to the appended drawings.

First Exemplary Embodiment

FIGS. **1** to **4** illustrate an image forming apparatus **1** according to a first exemplary embodiment.

FIG. **1** is an external view of the image forming apparatus **1** (in a state where an external cover thereof is open), FIG. **2** illustrates an internal configuration of the image forming apparatus **1**, FIG. **3** partially illustrates a process for attaching or detaching a developer recovery container to or from the image forming apparatus **1**, and FIG. **4** partially illustrates a state where the developer recovery container is detached from the image forming apparatus **1**. Arrows denoted by reference signs X, Y, and Z in FIG. **1** and so on are orthogonal coordinate axes indicating the width direction, the height direction, and the depth direction, respectively, in an assumed three-dimensional space.

Overall Configuration of Image Forming Apparatus

The image forming apparatus **1** according to the first exemplary embodiment forms an image constituted of a developer onto a recording sheet **9** as an example of a recording medium and serves as, for example, a printer that performs image formation by receiving image information input from an external device, such as an information terminal.

The image forming apparatus **1** has a housing **10** that is box-shaped in its entirety. As shown in FIG. **2**, the internal space of the housing **10** has disposed therein, for example, image forming devices **20** that form toner images constituted of toners as developers; an intermediate transfer device **30** that carries and then transports the toner images, formed at the image forming devices **20** and first-transferred on the intermediate transfer device **30**, and ultimately second-transfers the toner images onto the recording sheet **9**; a sheet feed device **40** that accommodates the recording sheet **9** and delivers the recording sheet **9** to a second-transfer position of the intermediate transfer device **30**; and a fixing device **45** that fixes the toner images second-transferred at the intermediate transfer device **30** onto the recording sheet **9**. An upper surface **10***a* of the housing **10** is provided with an output accommodation section **12** onto which the recording sheet **9** having the image formed thereon is output and stacked. A dotted-chain line shown in FIG. **2** denotes a transport path for the recording sheet **9** within the housing **10**.

The image forming devices **20** include four image forming devices **20**Y, **20**M, **20**C, and **20**K that individually form developer (toner) images of four respective colors, namely, yellow (Y), magenta (M), cyan (C), and black (K) colors. The image forming devices **20** (Y, M, C, and K) are arranged in the internal space of the housing **10** in an inclined state such that the positions thereof gradually increase in height in the following order: black, cyan, magenta, and yellow.

The four image forming devices **20** (Y, M, C, and K) each include a photoconductor drum **21** serving as a drum-type photoconductor that is rotationally driven in a direction indicated by an arrow (i.e., clockwise direction in FIG. **2**); a roller-type charging device **22** that electrostatically charges an outer peripheral surface serving as an image forming region of the photoconductor drum **21** to a predetermined potential; an exposure device **23** that radiates light disassembled into the corresponding color component based on predetermined image information onto the electrostatically-charged outer peripheral surface of the photoconductor drum **21** so as to form an electrostatic latent image of the color component; a developing device **24** (Y, M, C, or K) that develops the electrostatic latent image by supplying the toner of the corresponding color component thereto so as to form a visible toner image of the corresponding color; and a drum cleaning device **26** that cleans the photoconductor drum **21** by removing waste, such as the toner remaining on the outer peripheral surface thereof, after the toner image on the photoconductor drum **21** is first-transferred onto an intermediate transfer belt **31** of the intermediate transfer device **30**.

The developing devices **24** (Y, M, C, and K) respectively contain the toners of the color components corresponding to the aforementioned four colors (Y, M, C, and K) and are resupplied with developers (mostly toners) from developer suppliers (not shown) in accordance with information, such as consumed amounts thereof.

Each drum cleaning device **26** has a housing that accommodates therein, for example, a cleaning member **26***a* such as an elastic plate that scrapes off waste, such as residual toner, from the photoconductor drum **21** by coming into contact therewith, and a rotatable transport member **26***b* such a screw auger that transports the residual toner scraped off by the cleaning member **26***a* as waste toner toward a developer recovery container **6**.

Furthermore, with regard to each of the image forming devices **20** (Y, M, C, and K), the photoconductor drum **21**, the charging device **22**, the developing device **24** (Y, M, C, or K), and the drum cleaning device **26** are supported by a common support frame and are integrated into a single unit. The entire unit is an attachable-detachable unit that is used by being detachably attached to a corresponding one of attachment structural sections **11** (FIG. **4**) provided in the housing **10** of the image forming apparatus **1**.

When each image forming device **20** (Y, M, C, or K) receives an image formation request, the charging device **22** electrostatically charges the outer peripheral surface of the rotating photoconductor drum **21** to a predetermined potential, and the exposure device **23** subsequently radiates light corresponding to an image signal of the corresponding color component onto the electrostatically-charged outer peripheral surface of the photoconductor drum **21**, thereby forming an electrostatic latent image of the corresponding color component on the outer peripheral surface of the photoconductor drum **21**. Then, the corresponding developing device **24** develops the electrostatic latent image of the corresponding color component formed on the outer peripheral surface of the photoconductor drum **21** by using the toner of the corresponding color (Y, M, C, or K). As a result, toner images of the four colors are formed on the respective photoconductor drums **21**.

The intermediate transfer device **30** is disposed above the image forming devices **20** (Y, M, C, and K) in the gravitational direction in a slightly inclined state in correspondence with the inclined arranged state of the image forming devices **20**.

The intermediate transfer device **30** includes, for example, an endless intermediate transfer belt **31** that carries and then transports the toner images, formed on the photoconductor drums **21** of the image forming devices **20** (Y, M, C, and K) and first-transferred on the intermediate transfer belt **31**; multiple support rollers **32***a* to **32***e* that rotatably support the intermediate transfer belt **31** such that the intermediate transfer belt **31** sequentially pass through first-transfer positions of the image forming devices **20** (Y, M, C, and K); roller-type first-transfer devices **34** that are disposed within the intermediate transfer belt **31** and that generate a first-transfer effect for first-transferring the toner images formed on the photoconductor drums **21** of the image forming devices **20** (Y, M, C, and K) onto the outer peripheral surface of the intermediate transfer belt **31**; a roller-type second-transfer device **35** that generates a second-transfer effect for second-transferring the toner images first-transferred on the intermediate transfer belt **31** onto the recording sheet **9**; and a belt cleaning device **36** that cleans the intermediate transfer belt **31** by removing waste, such as the toners remaining on the outer peripheral surface thereof, after the second-transfer process.

The support roller **32***a* serves as a driving roller and a second-transfer backup roller, the support roller **32***c* serves as a tension applying roller, the support rollers **32***d* and **32***e* serve as leveling rollers, and the support roller **32***b* serves as a cleaning backup roller. The belt cleaning device **36** has a housing that accommodates therein, for example, a cleaning member **36***a* such as an elastic plate that scrapes off waste, such as residual toner, from the intermediate transfer belt **31** by coming into contact therewith, and a rotatable transport member **36***b* such a screw auger that transports the residual toner scraped off by the cleaning member **36***a* as waste toner toward the developer recovery container **6**.

The sheet feed device **40** is disposed below the image forming devices **20** (Y, M, C, and K) in the gravitational direction.

The sheet feed device **40** includes a sheet accommodating body **41** that is attached to the housing **10** in an ejectable

manner and that accommodates a stack of recording sheets **9** of a desired size and type on a stacking plate **42**, and a delivery device **43** that delivers the recording sheets **9** one-by-one from the sheet accommodating body **41**. During an image forming operation, the sheet feed device **40** causes the delivery device **43** to deliver a predetermined number of recording sheets **9** one-by-one from the sheet accommodating body **41**. Each recording sheet **9** delivered from the sheet feed device **40** travels along the transport path denoted by the dotted-chain line and is ultimately transported to the second-transfer position (between the intermediate transfer belt **31** and the second-transfer device **35**) of the intermediate transfer device **30** in accordance with a second-transfer timing by a pair of registration rollers **44** disposed in the transport path.

During the image forming operation, the toner images of the respective colors formed at the image forming devices **20** (Y, M, C, and K) are sequentially first-transferred in a positionally aligned state onto the outer peripheral surface of the intermediate transfer belt **31** in the intermediate transfer device **30** due to the first-transfer effect of the first-transfer devices **34**. In this case, in the image forming devices **20** (Y, M, C, and K), the outer peripheral surfaces of the photoconductor drums **21** are cleaned by the drum cleaning devices **26** after the first-transfer process. Subsequently, the intermediate transfer belt **31** transports the first-transferred toner images to the second-transfer position facing the second-transfer device **35**. Then, in the intermediate transfer device **30**, the second-transfer effect of the second-transfer device **35** causes the toner images on the intermediate transfer belt **31** to be second-transferred onto the recording sheet **9** fed to the second-transfer position from the sheet feed device **40**. In this case, in the intermediate transfer device **30**, the outer peripheral surface of the intermediate transfer belt **31** is cleaned by the belt cleaning device **36** after the second-transfer process.

The fixing device **45** is disposed above a second-transfer section (i.e., an area where the second-transfer device **35** is in contact with the intermediate transfer belt **31**) of the intermediate transfer device **30** in the gravitational direction.

The fixing device **45** has a housing that accommodates therein, for example, a roller-type or belt-type heating rotatable member **46** that is rotationally driven in a predetermined direction and whose surface temperature is maintained at a predetermined temperature by being heated by a heater, and a roller-type or belt-type pressing rotatable member **47** that substantially extends along the rotation axis of the heating rotatable member **46** and that is rotated by being in contact therewith with predetermined pressure.

During the image forming operation, the fixing device **45** transports the recording sheet **9** having the toner images second-transferred thereon at the intermediate transfer device **30** through a pressure contact section between the heating rotatable member **46** and the pressing rotatable member **47** so as to heat and press the recording sheet **9**, thereby fusing and fixing the toner images onto the recording sheet **9**. The recording sheet **9** after the fixing process travels along the transport path denoted by the dotted-chain line and is transported outside the housing **10** by a pair of output rollers **48** disposed in the transport path, so as to be ultimately output to and accommodated in the output accommodation section **12**.

The image forming apparatus **1** may selectively actuate all of or some of the image forming devices **20** (Y, M, C, and K) (i.e., at least multiple-color toners) so as to be capable of forming a color image constituted of a combination of all of or some of the toners of the four colors (Y, M, C, and K). Furthermore, the image forming apparatus **1** may actuate one of the image forming devices **20** (Y, M, C, and K) so as to be capable of forming a single-color image constituted of a single-color toner, such as black toner.

Configuration Related to Developer Recovery

As shown in FIG. **2**, in the image forming apparatus **1**, the developers to be recovered after being scraped off and removed by the drum cleaning devices **26** in the four image forming devices **20** (Y, M, C, and K) and the belt cleaning device **36** in the intermediate transfer device **30** are ultimately collected and recovered by a single detachable-type developer recovery container **6**.

Therefore, as shown in FIGS. **1** and **3**, in the image forming apparatus **1**, a first side surface **10***b* of the housing **10** is provided with an attachment structural section **13** for the developer recovery container **6**. The attachment structural section **13** is recessed inward from the first side surface **10***b* by a predetermined depth. The developer recovery container **6** is used by being detachably attached to the attachment structural section **13**. The first side surface **10***b* of the housing **10** is normally a side surface that is capable of partially exposing the four image forming devices **20** and the intermediate transfer device **30** to the outside.

The upper edge of the attachment structural section **13** for the developer recovery container **6** is partially provided with an upper support **14** that partially supports the upper portion of the developer recovery container **6** in a detachable manner when the developer recovery container **6** is attached. The lower edge of the attachment structural section **13** is partially provided with lower supports **15** that partially support the lower edge of the developer recovery container **6** such that the lower supports **15** may also be used as a rotation axis during the attaching-detaching operation. Additionally, the attachment structural section **13** is provided with an openable-closable outer cover **16** (FIG. **1**) serving as a part of the housing **10**. By opening and closing the outer cover **16** by rotating it in directions indicated by arrows C**1** and C**2** about its lower edge as an axis, the attachment structural section **13** is set in an externally exposed state and a covered state.

Furthermore, as shown in FIG. **4**, in order to transport and drain the developers scraped off and removed by the drum cleaning devices **26** and the belt cleaning device **36** to the developer recovery container **6** attached to the attachment structural section **13**, the image forming apparatus **1** is provided with developer drain pipes **17** (Y, M, C, and K) of the respective drum cleaning devices **26** and a developer drain pipe **18** of the belt cleaning device **36**. The developer drain pipes **17** (Y, M, C, and K) and the developer drain pipe **18** protrude into the space in the attachment structural section **13**. The developer drain pipes **17** (Y, M, C, and K) and the developer drain pipe **18** are each constituted of a cylindrical pipe body having a drain port for draining the developer to be recovered and a slide shutter that opens and closes the drain port by reciprocating within the pipe body in the lengthwise direction thereof.

Configuration of Detachable-Type Developer Recovery Container

As shown in FIGS. **5** and **6**, the developer recovery container **6** is a box-shaped container that has a predetermined space therein and that is like a substantially rectangular thick board that is long in its entirety in the transverse direction thereof.

The upper edge of the developer recovery container **6** is partially provided with a protrusion **60***a* that is detachably supported by the upper support **14** of the attachment structural section **13**, and the lower edge of the developer recovery container **6** is partially provided with plate-shaped

lower attachment portions **60***b* that are rotatably supported by the lower supports **15** of the attachment structural section **13**. The front surface of the developer recovery container **6** is provided with a handle hole **60***c* that is recessed toward the rear surface.

The developer recovery container **6** is attached to and detached from the attachment structural section **13** of the image forming apparatus **1** in the following manner.

First, as shown in FIG. **3**, when attaching the developer recovery container **6** to the attachment structural section **13** of the image forming apparatus **1**, the developer recovery container **6** is entirely set in a tilted position, and the lower attachment portions **60***b* are inserted into the lower supports **15** of the attachment structural section **13**. Then, the developer recovery container **6** is rotated in a direction indicated by an arrow D**2** about the lower attachment portions **60***b* as an axis, and the protrusion **60***a* located at the upper edge is secured by being supported by the upper support **14** of the attachment structural section **13**. Consequently, the developer recovery container **6** becomes attached to the attachment structural section **13** (see FIG. **1**).

When detaching the developer recovery container **6** from the attachment structural section **13** of the image forming apparatus **1**, the protrusion **60***a* located at the upper edge is released from the upper support **14** of the attachment structural section **13**, and the upper edge is pulled frontward so that the developer recovery container **6** is rotated in a direction indicated by an arrow D**1**, whereby the developer recovery container **6** is entirely set in a tilted position (see FIG. **3**). Then, the entire developer recovery container **6** is lifted diagonally frontward so as to remove the lower attachment portions **60***b* from the lower supports **15** of the attachment structural section **13**. Consequently, the developer recovery container **6** becomes detached from the attachment structural section **13** (see FIG. **4**).

Furthermore, as shown in FIGS. **5** and **6**, the upper portion of the developer recovery container **6** is provided with connection sections **61** to be connected to the developer drain pipes **17** (Y, M, C, and K) of the respective drum cleaning devices **26** and to the developer drain pipe **18** of the belt cleaning device **36** when attaching the developer recovery container **6** to the attachment structural section **13** of the image forming apparatus **1**. Moreover, the developer recovery container **6** is provided with an accommodation section **62** below the connection sections **61** (in the gravitational direction). The accommodation section **62** has a space for ultimately accommodating the developer drained from the drain ports of the developer drain pipes **17** (Y, M, C, and K) and the developer drain pipe **18**.

The connection sections **61** include four connection sections **61**Y, **61**M, **61**C, and **61**K to be connected to the developer drain pipes **17** (Y, M, C, and K) of the respective drum cleaning devices **26** and a single connection section **61**B to be connected to the developer drain pipe **18** of the belt cleaning device **36**.

Each of the connection sections **61** (Y, M, C, and K) and **61**B is a structural section having a connection port to which the pipe body of the corresponding developer drain pipe **17** or **18** is to be fitted and a storage space in which the pipe body is to be stored. Furthermore, in each of the connection sections **61** (Y, M, C, and K) and **61**B, a bottom surface (which also serves as a partition plate separated from the accommodation section **62**) within the storage space has a reception port for receiving the developer drained and dripping from the drain port of the corresponding developer drain pipe **17** or **18**. Moreover, in each of the connection sections **61** (Y, M, C, and K) and **61**B, the bottom surface having the reception port is provided with a rotatable shutter that opens and closes the reception port. The rotatable shutter rotationally moves parallel to the bottom surface having the reception port in conjunction with movement relative to the corresponding developer drain pipe **17** or **18**, thereby opening and closing the reception port.

The accommodation section **62** has an accommodation space for accommodating a predetermined amount of developer drained and dripping from the drain ports of the developer drain pipes **17** and **18**. The accommodation space is a single space connected to the reception ports of the connection sections **61** (Y, M, C, and K) and **61**B.

Furthermore, the accommodation section **62** has disposed therein, for example, a rotatable transport member **65** (FIG. **6**) such as a screw auger that rotates to even out and move the developer so as to reduce uneven deposition of the developer accommodated in the accommodation space, and a detector (not shown) for detecting that the amount of developer accommodated in the accommodation space has reached an amount set as an indication for replacing the developer recovery container **6**.

The rotatable transport member **65** in the developer recovery container **6** is constituted of a rotation shaft and a transport blade formed helically around the rotation shaft. As shown in FIG. **6**, the rotatable transport member **65** has a rotation shaft **65***a* that is provided within the accommodation space of the accommodation section **62** in a rotatable manner and in an inclined state in correspondence with the inclined arranged state of the connection sections **61**Y, **61**M, **61**C, and **61**K. In FIG. **6**, the rotatable transport member **65** is shown with only the rotation shaft (**65***a*) but not with the helical transport blade for the sake of convenience.

With regard to the rotatable transport member **65**, a relatively lower end of the rotation shaft **65***a* is provided with a connection member **66** for connecting to a rotation transmission mechanism **7**, which will be described below. As shown in FIGS. **5** and **6**, the connection member **66** is constituted of a disk-shaped body **66***a* fixed to one end of the rotation shaft **65***a* of the rotatable transport member **65** and a connection protrusion **66***b* extending outward in the axial direction from a part of one surface of the body **66***a*. The connection protrusion **66***b* is, for example, plate-shaped. The connection member **66** is disposed in an externally exposed state in a recess formed in a lower portion of the developer recovery container **6**.

Configuration of Rotation Transmission Mechanism

As shown in FIGS. **1**, **3**, **4**, and **7**, the image forming apparatus **1** includes the rotation transmission mechanism **7** at a lower end of the attachment structural section **13** for the developer recovery container **6**. When the developer recovery container **6** is attached to the attachment structural section **13**, the rotation transmission mechanism **7** is connected to the rotatable transport member **65** and transmits rotational driving force thereto.

As shown in FIGS. **7** to **9**, the rotation transmission mechanism **7** includes, for example, a support frame **70** fixed to the attachment structural section **13** for the developer recovery container **6**, a shaft **71** extending through the support frame **70** in directions D**1** and D**2** of movement occurring when the developer recovery container **6** is attached and detached, a first stationary gear **72** disposed in a rotatable manner while being positionally fixed to the support frame **70**, a displacement gear **73** that is rotatably attached to the shaft **71** and is displaced in the axial direction of the shaft **71** (i.e., the direction parallel to the direction of the coordinate axis Z) in conjunction with movement occurring when the developer recovery container **6** is attached and

detached, and a pressing plate **74** that causes the displacement gear **73** to move toward the shaft **71**. In FIG. **7** and so on, the teeth of the gears are not shown.

The support frame **70** is a plate member formed to a predetermined shape for arranging and attaching the shaft **71**, the first stationary gear **72**, the displacement gear **73**, and so on, and is fixed to the components constituting the attachment structural section **13** by using, for example, multiple screws **19**. The support frame **70** in the first exemplary embodiment has a body **70***a* provided with a circular opening **70***b* with a size large enough for allowing the displacement gear **73** to pass through; a first bent surface **70***c* bent outward from the body **70***a* at a substantially right angle so as to ensure a space for disposing the shaft **71**, the displacement gear **73**, the pressing plate **74**, and so on; and a second bent surface **70***d* bent so as to extend substantially parallel to the body **70***a* from the terminal end of the first bent surface **70***c* and also to face the opening **70***b*.

The shaft **71** is attached to the support frame **70** so as to extend in the directions D**1** and D**2** of movement occurring when the developer recovery container **6** is attached to and detached from the attachment structural section **13**. To be exact, the directions D**1** and D**2** of movement occurring when the developer recovery container **6** is attached and detached in the first exemplary embodiment are directions that form a circular-arc line about an axis. However, because the movement directions D**1** and D**2** form a straight line when view from, for example, above or below in the gravitational direction, the linear motion is set as a reference for the position of the shaft **71**. Therefore, the shaft **71** is disposed so as to extend in a direction in which it linearly reciprocates substantially in a horizontal state (i.e., the direction parallel to the direction of the coordinate axis Z) between the front side and the rear side of the image forming apparatus **1**.

A columnar member having a predetermined length is used as the shaft **71**. With regard to this shaft **71**, a first end **71***a* thereof at the front side of the image forming apparatus **1** is securely attached to the second bent surface **70***d* of the support frame **70**, and a second end **71***b* extends through the substantially central position of the opening **70***b* in the body **70***a* of the support frame **70** and protrudes to a position opposite the second bent surface **70***d* of the body **70***a* (FIG. **9**).

The first stationary gear **72** is disposed so as to be located at a position opposite the second bent surface **70***d* of the body **70***a* of the support frame **70**. Thus, the first stationary gear **72** is disposed so as not to be exposed to the outside due to the existence of the body **70***a*. In other words, the first stationary gear **72** is substantially covered by the body **70***a* of the support frame **70** so as to be substantially hidden from the outside.

Furthermore, as shown in FIGS. **9** and **10**, the first stationary gear **72** is constituted of a disk-shaped gear body **72***a* whose central portion at one side thereof is recessed, and multiple connection protrusions **75** as shaft couplings provided in the recessed portion of the gear body **72***a* and protruding toward the displacement gear **73**. Moreover, the first stationary gear **72** is rotatably attached to the second end **71***b* of the shaft **71** so as to rotate at a fixed position via a shaft bearing. Furthermore, the first stationary gear **72** is attached such that the surface thereof provided with the connection protrusions **75** faces the opening **70***b* in the body **70***a*.

The first stationary gear **72** meshes with a second stationary gear **78** attached to the body **70***a* of the support frame **70** and receives rotational driving force from the second stationary gear **78**. The second stationary gear **78** is rotatably attached to a shaft **79** that is fixed to the same surface of the body **70***a* of the support frame **70** as the surface where the first stationary gear **72** is disposed. Furthermore, as shown in FIG. **7**, the shaft **79** is connected, via an opening **13***a* provided in the attachment structural section **13**, to a rotational driving device (not shown) disposed in the housing **10** of the image forming apparatus **1** and is rotationally driven by receiving rotational driving force from the rotational driving device.

The displacement gear **73** is located between the body **70***a* and the second bent surface **70***d* of the support frame **70**. The displacement gear **73** is displaceable in directions indicated by arrows E**1** and E**2** relative to the shaft **71** and is attached rotatably around the shaft **71**. With regard to the displacement gear **73**, a portion thereof excluding the portion thereof covered by the first bent surface **70***c* and the second bent surface **70***d* of the support frame **70** is exposed to the outside. In other words, the displacement gear **73** has an exposed portion that is not covered by the support frame **70** and so on. Therefore, the body **70***a* of the support frame **70** serves as a partition member that is located between the first stationary gear **72** and the displacement gear **73**. Specifically, the body **70***a* of the support frame **70** serving as the partition member does not expose the first stationary gear **72** to the outside but exposes the displacement gear **73** to the outside.

Furthermore, as shown in FIGS. **8** to **10**, the displacement gear **73** is constituted of a columnar gear body **73***a* and multiple connection receiving protrusions **76** as shaft couplings protruding toward the first stationary gear **72** from an end of the gear body **73***a* that faces the first stationary gear **72**. The displacement gear **73** is rotatably attached to the first end **71***a* of the shaft **71** via a shaft bearing **73***b* and is displaceable in the directions indicated by the arrows E**1** and E**2** which extend parallel to the axial direction of the shaft **71**. The connection receiving protrusions **76** are provided on one surface of a flange **73***c* disposed at one end of the gear body **73***a* of the displacement gear **73** and having a diameter larger than that of the gear body **73***a*.

Furthermore, one end of the displacement gear **73** is elastically pressed away from the first stationary gear **72** (i.e., in the direction indicated by the arrow E**1**) by spring force of a coil spring **77** secured to the first stationary gear **72**. In other words, unless the displacement gear **73** is pressed toward the first stationary gear **72**, the displacement gear **73** is pressed away from the first stationary gear **72** (i.e., in the direction indicated by the arrow E**1**) by the spring force of the coil spring **77**, so that the connection receiving protrusions **76** in the displacement gear **73** do not come into contact with the connection protrusions **75** in the first stationary gear **72** and are maintained out of connection with the connection protrusions **75** (i.e., in a disconnected state). As will be described later, when the displacement gear **73** is pressed by the pressing plate **74** toward the first stationary gear **72** (i.e., in the direction indicated by the arrow E**2**) against the spring force of the coil spring **77**, the connection receiving protrusions **76** come into contact with the connection protrusions **75** in the first stationary gear **72** and are maintained in connection therewith (i.e., in a connected state).

The pressing plate **74** is attached to the shaft **71** in a displaceable manner in the directions indicated by the arrows E**1** and E**2** and presses against the displacement gear **73** in conjunction with the attaching operation of the developer recovery container **6**, which will be described later, so as to move the displacement gear **73** toward the first sta-

tionary gear **72**. As shown in FIG. **10**, the pressing plate **74** is formed of a plate member having a predetermined shape, such as a trapezoidal shape with rounded corners in its entirety, and partially provided with an attachment hole **74***a* for attaching the pressing plate **74** in a displaceable manner to the shaft **71**.

The pressing plate **74** is attached to the shaft **71** so as to be located between the displacement gear **73** and the second bent surface **70***d* of the support frame **70**. Moreover, the pressing plate **74** is attached to the shaft **71** such that the pressing plate **74** is not in contact with the gear body **73***a* of the displacement gear **73** but is in contact with the shaft bearing **73***b* and such that a portion **74***b* thereof protrudes from the second bent surface **70***d* of the support frame **70**. Alternatively, the pressing plate **74** may be attached by being bonded to the shaft bearing **73***b* of the displacement gear **73**. Furthermore, the pressing plate **74** is pressed in the direction indicated by the arrow E**2** by a pressing protrusion **68**, which will be described later, in the developer recovery container **6**.

As shown in FIGS. **1**, **3**, **4**, **7**, and **11**, the rotation transmission mechanism **7** has disposed therein an intermediate gear **80** that rotates by meshing with the displacement gear **73** and that transmits its rotational driving force to the rotatable transport member **65** of the developer recovery container **6**.

The intermediate gear **80** is rotatably attached to a shaft **81** whose one end is fixed substantially orthogonally to the first bent surface **70***c* of the support frame **70**. In this case, the intermediate gear **80** is attached to the shaft **81** so as to face the connection member **66** in the developer recovery container **6** when the intermediate gear **80** is attached in a meshed state with the displacement gear **73**. The shaft **81** is disposed substantially orthogonally to the shaft **71** to which the displacement gear **73** and so on are attached.

An end surface **80***b* of the intermediate gear **80** that is located opposite the first bent surface **70***c* is provided with a connection member **85** that is connectable to and disconnectable from the connection protrusion **66***b* of the connection member **66** in the developer recovery container **6**. As shown in FIGS. **7** and **8**, the connection member **85** serves as a connection receiving protrusion that protrudes outward in the axial direction of the shaft **81** from the end surface **80***b* of the intermediate gear **80**. The connection member **85** may be of any type that comes into contact with the connection protrusion **66***b* of the connection member **66** in the developer recovery container **6** and that transmits rotational driving force thereto. In the first exemplary embodiment, the connection member **85** is columnar-shaped.

Furthermore, as shown in FIGS. **1**, **7**, and **11**, the rotation transmission mechanism **7** includes a protection cover **90** for protecting some of the components of the rotation transmission mechanism **7** from the outside by covering them at the lower edge of the attachment structural section **13**.

The protection cover **90** is formed of a component with a shape that covers the first bent surface **70***c* and the second bent surface **70***d* of the support frame **70** and that also partially covers the portion **74***b* of the pressing plate **74** that protrudes from the second bent surface **70***d*. Except for the fact that the displacement gear **73**, the portion **74***b* of the pressing plate **74**, and the end surface **80***b* of the intermediate gear **80**, which are some of the components constituting the rotation transmission mechanism **7**, are exposed to the outside, the protection cover **90** covers the remaining components from the outside. Moreover, the protection cover **90** is, for example, fixed by being attached to a part of a wall surface of the attachment structural section **13**.

In order to allow the pressing protrusion **68**, which will be described later, of the developer recovery container **6** to come into contact with and press against the protruding portion **74***b* of the pressing plate **74**, the protection cover **90** is partially provided with a cutout **92** that exposes a part of the protruding portion **74***b* of the pressing plate **74** to the outside. Moreover, areas above and below the cutout **92** of the protection cover **90** are respectively provided with bent cover sections **95** and **96** that are bent so as to extend in the direction indicated by the arrow E**2** corresponding to the displacement direction (i.e., the pressed direction) of the pressing plate **74**. The bent cover sections **95** and **96** cover the protruding portion **74***b* of the pressing plate **74** so as not to expose the portion **74***b* to the outside. The cutout **92** is formed with a size small enough to keep, for example, an operator's finger away from the inside.

In the rotation transmission mechanism **7**, for example, during an image forming operation as well as before and after the image forming operation, the rotational driving device (not shown) actuates and generates rotational driving force, and the rotational driving force is transmitted via the second stationary gear **78**, whereby the first stationary gear **72** is rotationally driven. When performing an operation for opening the outer cover **16** or performing an attaching-detaching operation of the developer recovery container **6**, the image forming apparatus **1** is not configured to perform control for forcedly stopping the rotation of the aforementioned rotational driving device (not shown), which transmits the rotational driving force to the rotation transmission mechanism **7**, in conjunction with the operation.

On the other hand, as shown in FIGS. **5** and **11**, in relation to the configuration of the rotation transmission mechanism **7**, the developer recovery container **6** is provided with the pressing protrusion **68** that comes into contact with the protruding portion **74***b* of the pressing plate **74** in the rotation transmission mechanism **7** and that presses the pressing plate **74** toward the first stationary gear **72** when the developer recovery container **6** is being attached to the attachment structural section **13**.

The pressing protrusion **68** is provided at the lower edge of the developer recovery container **6**, where the connection member **66** of the rotatable transport member **65** is disposed, and has a size and shape that allow the pressing protrusion **68** to enter the cutout **92** of the protection cover **90** and to press against the pressing plate **74**. Furthermore, when the developer recovery container **6** is attached to the attachment structural section **13**, the pressing protrusion **68** is disposed at a position where the pressing protrusion **68** is capable of continuously pressing the protruding portion **74***b* of the pressing plate **74** toward the first stationary gear **72** by a predetermined distance in the direction indicated by the arrow E**2**.

Operations Related to Developer Recovery Container and Rotation Transmission Mechanism

The operation of the rotation transmission mechanism **7** when attaching and detaching the developer recovery container **6** will be described below.

First, if the developer recovery container **6** is not attached to (i.e., detached from) the attachment structural section **13** of the image forming apparatus **1**, the displacement gear **73**, the intermediate gear **80**, and the connection member **85** in the rotation transmission mechanism **7** disposed at the lower edge of the attachment structural section **13** are not covered by the support frame **70** and the protection cover **90** and are thus exposed to the outside of the attachment structural section **13**, as shown in FIG. **7**.

In this case, as shown in FIGS. **8** and **9**, in the rotation transmission mechanism **7**, the displacement gear **73** is elastically pressed in the direction indicated by the arrow E**1** due to the spring force of the coil spring **77**, so that the displacement gear **73** moves on the shaft **71** to a position located away from the first stationary gear **72**. Thus, the connection receiving protrusions **76** in the displacement gear **73** are maintained out of connection (i.e., in a disconnected state) with the connection protrusions **75** in the first stationary gear **72**.

As a result, in the rotation transmission mechanism **7**, since the rotational driving force of the first stationary gear **72** is not transmitted to the displacement gear **73** even when the first stationary gear **72** is rotationally driven, the displacement gear **73** and the intermediate gear **80** are in a non-rotating state (i.e., a stopped state).

Therefore, when the developer recovery container **6** is not attached to the attachment structural section **13** in the image forming apparatus **1**, safety may be ensured even if there is a possibility that the operator performing the attaching-detaching operation of the developer recovery container **6** may mistakenly touch the displacement gear **73**, the intermediate gear **80**, and so on exposed to the outside in the rotation transmission mechanism **7**.

Subsequently, when the developer recovery container **6** is to be attached to the attachment structural section **13** of the image forming apparatus **1**, the developer recovery container **6** is entirely set in a tilted position, and the lower attachment portions **60***b* are inserted into the lower supports **15** of the attachment structural section **13**, as described above (see FIG. **3**). Then, the developer recovery container **6** is rotated upward in the direction indicated by the arrow D**2** about the lower attachment portions **60***b* as an axis, and the protrusion **60***a* located at the upper edge is secured by being supported by the upper support **14** of the attachment structural section **13**.

In the process of attaching the developer recovery container **6**, as shown in FIG. **11**, the pressing protrusion **68** moves in the direction indicated by the arrow D**2** in conjunction with the rotating motion of the developer recovery container **6** in the direction indicated by the arrow D**2**, so that the pressing protrusion **68** comes into contact with the protruding portion **74***b* of the pressing plate **74** after passing through the cutout **92** in the protection cover **90** of the rotation transmission mechanism **7**, whereby the pressing plate **74** is pressed toward the first stationary gear **72**.

Consequently, as shown in FIGS. **11** to **14**, in the rotation transmission mechanism **7**, the displacement gear **73** is pressed by the pressing plate **74** and moves on the shaft **71** in the direction indicated by the arrow E**2** against the spring force of the coil spring **77** to a position close to the first stationary gear **72**. Thus, the connection receiving protrusions **76** in the displacement gear **73** come into contact with the connection protrusions **75** in the first stationary gear **72** and are maintained in connection therewith (i.e., in a connected state).

Just before the developer recovery container **6** becomes attached to the attachment structural section **13**, the connection protrusion **66***b* of the connection member **66** in the rotatable transport member **65** of the developer recovery container **6** comes into contact with the connection member **85** of the intermediate gear **80** in the rotation transmission mechanism **7** so as to become connected therewith (see FIG. **12**).

As a result, in the rotation transmission mechanism **7**, the rotational driving force from the first stationary gear **72** is transmitted to the displacement gear **73**, so that the intermediate gear **80** connected (meshed) with the displacement gear **73** is rotationally driven. In the developer recovery container **6**, the rotational driving force of the intermediate gear **80** is transmitted to the rotatable transport member **65** via the connection member **66**, so that the rotatable transport member **65** is rotationally driven within the accommodation section **62**.

As shown in FIGS. **1** and **11**, in the state where the developer recovery container **6** is attached to the attachment structural section **13**, the displacement gear **73**, the intermediate gear **80**, and the connection member **85** that are previously exposed to the outside in the rotation transmission mechanism **7** become hidden due to the existence of the developer recovery container **6** so as to become not exposed to the outside.

Therefore, in the image forming apparatus **1**, the displacement gear **73** in the rotation transmission mechanism **7** may be efficiently connected to the first stationary gear **72** in conjunction with the attaching operation of the developer recovery container **6**, thereby setting the rotation transmission mechanism **7** in a state where it is capable of transmitting the rotational driving force. In addition, the connection member **66** of the rotatable transport member **65** in the developer recovery container **6** may be connected to the rotatable transport member **65** of the intermediate gear **80** in the rotation transmission mechanism **7** in conjunction with the attaching operation of the developer recovery container **6**, thereby setting the rotatable transport member **65** in a rotationally drivable state.

Subsequently, when the developer recovery container **6** is to be detached from the attachment structural section **13** of the image forming apparatus **1**, the protrusion **60***a* of the developer recovery container **6** is released from the upper support **14** of the attachment structural section **13**, and the upper edge of the developer recovery container **6** is pulled frontward so that the entire developer recovery container **6** is rotated in the direction indicated by the arrow D**1** and is set in a tilted position (see FIG. **3**), as described above. Then, the entire developer recovery container **6** is lifted diagonally frontward so as to remove the lower attachment portions **60***b* from the lower supports **15** of the attachment structural section **13** (see FIG. **4**).

In the process of detaching the developer recovery container **6**, the pressing protrusion **68** moves in the direction indicated by the arrow D**1** in conjunction with the rotating motion of the developer recovery container **6** in the direction indicated by the arrow D**1**, so that the pressing protrusion **68** moves out of contact with the protruding portion **74***b* of the pressing plate **74** in the rotation transmission mechanism **7** and subsequently moves outward by passing through the cutout **92** in the protection cover **90**. Thus, the displacement gear **73** is released from the pressing effect by the pressing plate **74** and is simultaneously pressed by receiving the spring force of the coil spring **77**, so that the displacement gear **73** moves on the shaft **71** to a position located away from the first stationary gear **72**.

In the process of performing this detaching operation, the connection member **66** of the rotatable transport member **65** in the developer recovery container **6** is separated (i.e., into a disconnected state) from the connection member **85** of the intermediate gear **80** in the rotation transmission mechanism **7**.

Furthermore, when the developer recovery container **6** is detached from the attachment structural section **13**, the displacement gear **73**, the intermediate gear **80**, and the connection member **85** in the rotation transmission mecha-

nism **7** previously hidden due to the existence of the developer recovery container **6** become exposed to the outside (FIG. **7**).

Thus, as shown in FIGS. **8** and **9**, in the rotation transmission mechanism **7**, the connection receiving protrusions **76** in the displacement gear **73** displaced in the direction indicated by the arrow E**1** are maintained out of connection (i.e., in a disconnected state) with the connection protrusions **75** in the first stationary gear **72**. As a result, in the rotation transmission mechanism **7**, since the rotational driving force of the first stationary gear **72** is not transmitted to the displacement gear **73** even when the first stationary gear **72** is rotationally driven, the displacement gear **73** and the intermediate gear **80** are in a non-rotating state (i.e., a stopped state).

Therefore, when the developer recovery container **6** is being detached from the attachment structural section **13** in the image forming apparatus **1**, safety may be ensured even if there is a possibility that the operator performing the attaching-detaching operation of the developer recovery container **6** may mistakenly touch the displacement gear **73**, the intermediate gear **80**, and so on exposed to the outside in the rotation transmission mechanism **7**. Moreover, supposing that the recovered developer drips from, for example, the developer recovery container **6** toward the rotation transmission mechanism **7**, since the body **70***a* of the support frame **70** covers and hides the first stationary gear **72** and so on from the outside, a portion of the recovered developer may be prevented from entering the housing **10** of the image forming apparatus **1** via a part of the rotation transmission mechanism **7**.

Furthermore, as described above, when performing an operation for opening the outer cover **16** or performing an attaching-detaching operation of the developer recovery container **6**, the image forming apparatus **1** is not configured to perform control for forcedly stopping the rotation of the rotational driving device (not shown), which transmits the rotational driving force to the rotation transmission mechanism **7**, in conjunction with the operation. Even so, the connection and disconnection between the rotatable transport member **65** of the developer recovery container **6** and the rotation transmission mechanism **7** in the attachment structural section **13** may be performed efficiently and safely. Consequently, the image forming apparatus **1** provides an option for omitting a relatively expensive detector (such as a detection sensor) for detecting the opening operation of the outer cover **16** or the attaching-detaching operation of the developer recovery container **6**. In the case where such a detector is omitted, cost reduction may be achieved.

Furthermore, in the image forming apparatus **1**, a large-scale component does not have to be disposed in the area where the connection and disconnection between the rotatable transport member **65** of the developer recovery container **6** and the rotation transmission mechanism **7** in the attachment structural section **13** are performed, and an additional installation space for disposing such a component does not have to be ensured, so that the area where the connection and disconnection are performed may be made compact.

Other Exemplary Embodiments

In the first exemplary embodiment, the first stationary gear **72** in the rotation transmission mechanism **7** is attached together with the displacement gear **73** to the shaft **71** as an example. Alternatively, the first stationary gear **72** may be attached to another shaft that is disposed separately from the shaft **71**.

In that case, the other shaft is disposed so as to extend in the same direction as the shaft **71** and also to face the shaft **71**. Moreover, the other shaft in that case may be provided in, for example, a part of the support frame **70** or a component constituting the attachment structural section **13**.

Furthermore, in the first exemplary embodiment, the protection cover **90** that partially covers the rotation transmission mechanism **7** is provided as an example. Alternatively, the protection cover **90** may be omitted. In order to partially expose the pressing plate **74** in the rotation transmission mechanism **7** to the outside, the protection cover **90** may have a through-hole having a predetermined opening shape in place of the cutout **92** described as an example in the first exemplary embodiment.

In this case, the pressing protrusion **68** as a stopper in the developer recovery container **6** has to be a protrusion with a shape and size that avoid contact with the protection cover **90** while being capable of passing through the through-hole to come into contact with a part of the pressing plate **74** during the attaching operation of the developer recovery container **6**. Moreover, in this case, the pressing plate **74** as a moving member in the rotation transmission mechanism **7** may be omitted, and the pressing protrusion **68** in the developer recovery container **6** may be configured to come into contact with and press against the shaft bearing **73***b* of the displacement gear **73**.

Furthermore, in the first exemplary embodiment, the developer recovery container **6** is of a type that is attached and detached by being rotationally moved relative to the attachment structural section **13** of the image forming apparatus **1**. Alternatively, for example, the developer recovery container **6** may be of a type that is attached and detached by being moved substantially linearly relative to the attachment structural section **13** of the image forming apparatus **1**.

In a case where the image forming apparatus according to an exemplary embodiment of the present invention is of a type that is capable of forming a color image, the image forming apparatus may be of a type that does not use an intermediate transfer device (i.e., a so-called direct transfer type that transports a recording sheet to make the recording sheet pass through the first-transfer positions at the image forming devices and that directly transfers toner images onto the recording sheet). Furthermore, the image forming apparatus according to an exemplary embodiment of the present invention may be of a type that forms a single-color image, such as a monochrome image.

The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. An image forming apparatus comprising:

a developer recovery container that has a rotatable member;

an attachment structural section to which the developer recovery container is detachably attached; and

a rotation transmission mechanism that is disposed in one area of the attachment structural section and that is connected to the rotatable member and transmits rotational driving force to the rotatable member when the developer recovery container is attached,

wherein the rotation transmission mechanism includes

a shaft that extends in a direction of movement occurring when the developer recovery container is attached and detached,

a stationary transmission member that is disposed in a positionally fixed state and that is rotationally driven,

a displacement transmission member that is attached to the shaft such that the displacement transmission member rotates and shifts in an axial direction of the shaft in conjunction with the movement occurring when the developer recovery container is attached and detached, the displacement transmission member shifting toward and connecting to the stationary transmission member when the developer recovery container is attached, the displacement transmission member shifting away from and disconnecting from the stationary transmission member when the developer recovery container is detached, and

a moving member that moves the displacement transmission member toward the stationary transmission member, and

wherein the developer recovery container has a stopper that comes into contact with the moving member and that moves the moving member toward the stationary transmission member when the developer recovery container is attached.

2. The image forming apparatus according to claim **1**,

wherein the rotation transmission mechanism has an intermediate transmission member that is provided with a disconnectable first connection member disposed in a positionally fixed state and that rotates by connecting to the displacement transmission member, and

wherein the rotatable member of the developer recovery container is provided with a second connection member that is connectable to and disconnectable from the first connection member of the intermediate transmission member when the developer recovery container is attached and detached.

3. The image forming apparatus according to claim **1**,

wherein the stationary transmission member is constituted of a disconnectable first shaft coupling and a stationary gear provided with the first shaft coupling, and

wherein the displacement transmission member is constituted of a second shaft coupling, which is connectable to and disconnectable from the first shaft coupling of the stationary transmission member, and a displacement gear provided with the second shaft coupling.

4. The image forming apparatus according to claim **1**,

wherein a partition member is disposed between the stationary transmission member and the displacement transmission member such that the partition member does not expose the stationary transmission member to outside and exposes the displacement transmission member to the outside.

5. The image forming apparatus according to claim **1**, further comprising:

a cover member that is opened and closed so as to expose the attachment structural section to outside and to cover and hide the attachment structural section,

wherein the image forming apparatus is not configured to perform control for stopping rotation of the rotation transmission mechanism in conjunction with an opening operation of the cover member.

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